

What is claimed is:

1. A positioning apparatus comprising:

a brushless motor;

a positioning mechanism to position a movable member within a predetermined movable range in accordance with rotation of the brushless motor; and

a motor control circuit to rotate a rotor of the brushless motor by sequentially supplying a driving pulse to a plurality of fixed coils of the brushless motor;

wherein the motor control circuit comprises:

driving pulse generating means to generate the driving pulse,

present stage number detecting means to detect a present stage number of the rotor in accordance with an output signal from a magneto-sensitive device of the brushless motor,

initialization means to move the movable member to at least a forward traveling limit or a backward traveling limit within the movable range so as to set the rotor present stage number as a forward traveling limit stage number or a backward traveling stage number when the movable member reaches the forward traveling limit or the backward traveling limit, and

speed reduction means to reduce a rotating speed of the brushless motor by reducing power of the driving pulse when the rotor present stage number is equal to one of the forward traveling limit stage number and the backward traveling stage number.

2. The positioning apparatus according to claim 1,

wherein the speed reduction means reduces the rotating speed of the brushless motor when the rotor present stage number is equal to a stage number that is less than one of the forward traveling limit stage number and the backward traveling stage number by at least one.

3. The positioning apparatus according to claim 1, wherein the driving pulse comprises a series of a plurality of pulses, and the speed reduction means issues a command to make each of the plurality of pulses have a reduced duty ratio.

4. The positioning apparatus according to claim 1, wherein the rotor present stage number corresponds to one of six control stage numbers determined from a combination of output signals from three magneto-sensitive devices.

5. The positioning apparatus according to claim 1, wherein the magneto-sensitive device is a Hall sensor.

6. The positioning apparatus according to claim 1, wherein at least three magneto-sensitive device are provided around the brushless motor.

7. The positioning apparatus according to claim 1, wherein the movable member is a gear ratio determining member of an automatic transmission of a vehicle.

8. The positioning apparatus according to claim 1, wherein the stage number increments when the rotor turns through 60 degrees.

9. A positioning apparatus comprising:
a brushless motor;
a positioning mechanism to position a movable member

within a predetermined movable range in accordance with rotation of the brushless motor; and

a motor control circuit to rotate a rotor of the brushless motor by sequentially supplying a driving pulse to a plurality of fixed coils of the brushless motor;

wherein the motor control circuit comprises:

a driving pulse generator to generate the driving pulse,

a present stage number detector to detect a present stage number of the rotor in accordance with an output signal from a magneto-sensitive device of the brushless motor,

an initializer to move the movable member to at least a forward traveling limit or a backward traveling limit within the movable range so as to set the rotor present stage number as a forward traveling limit stage number or a backward traveling stage number when the movable member reaches the forward traveling limit or the backward traveling limit, and

a speed reducer to reduce a rotating speed of the brushless motor by reducing power of the driving pulse when the rotor present stage number is equal to one of the forward traveling limit stage number and the backward traveling stage number.

10. The positioning apparatus according to claim 9, wherein the speed reducer reduces the rotating speed of the brushless motor when the rotor present stage number is equal to a stage number that is less than one of the forward traveling limit stage number and the backward traveling stage number by at least one.

11. The positioning apparatus according to claim 9, wherein the driving pulse comprises a series of a plurality of pulses, and the speed reducer issues a command to make each of the plurality of pulses have a reduced duty ratio.

12. The positioning apparatus according to claim 9, wherein the rotor present stage number corresponds to one of six control stage numbers determined from a combination of output signals from three magneto-sensitive devices.

13. The positioning apparatus according to claim 9, wherein the magneto-sensitive device is a Hall sensor.

14. The positioning apparatus according to claim 9, wherein at least three magneto-sensitive device are provided around the brushless motor.

15. The positioning apparatus according to claim 9, wherein the movable member is a gear ratio determining member of an automatic transmission of a vehicle.

16. The positioning apparatus according to claim 9, wherein the stage number increments when the rotor turns through 60 degrees.